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Specification

INTEGRATED COMMUNICATIONS SWITCHING SYSTEM (ICSS)



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3.2.1.1.2.5 Frequency response. - The voice signal amplitude at frequencies between 300 to 3000 Hz shall be within pulse or minus 2 dB of the 1000 Hz plus or minus 25 Hz amplitude level. Frequency attenuation roll-off characteristics of voice frequency paths below 300 Hz and above 3000 Hz shall be at a minimum rate of 6 db per octave.

3.2.1.1.2.6 Harmonic distortion. - The total end-to-end harmonic distortion produced in a voice circuit by any single frequency between 300 and 3000 Hz applied at a level of -3 dBm0 shall not exceed -34 dBm0.

3.2.1.1.2.8 Radio channel characteristics. - Each radio receive channel shall be capable of accepting a -8 dBm nominal transmission level from the radio trunk. Each receive channel shall provide a manual adjustment feature, readily accessible to maintenance personnel, to compensate for level changes within the range of +3dBm to -33dBm. In conjunction with the push-to-talk, the associated radio receiver signals shall be muted for the duration of the push-to-talk function. Each radio transmit channel shall deliver a 0 dBm nominal transmission level to the radio trunk with a provision for manual adjustment to nominals within the range of +3 dBm to -10 dBm. In establishing communications from the system to live radio trunks, the push-to-talk mode shall provide a closure which shall switch up to 100 milliamperes to signal ground, with a leakage in the OFF state not to exceed 0.1 milliampere.

3.2.1.1.3 Voice frequency path. - The level of voice frequencies between 300 and 3000 Hz when transmitted and received at positions shall be regulated as follows.

3.2.1.1.3.1 Transmit voice path. - The loss in all transmitting voice paths from any position to the FAA demarcation point shall be constant at 0 dB within + 1 dB, exclusive of a linear gain/loss adjustment. This adjustable gain/lose shall be provided with the range of + 15 dB.

30 dB Sudden Increase. - The instantaneous output level, including transients, shall not increase by more than 5 dB or decrease by more than 3 dB. The output level shall be within +0.5 dB of the final steady state value within 10 ms from the instant of input level change.

30 dB Sudden Decrease. - Immediately following the 10 ms stabilization period after the 30 dB increase, and with a sudden 30 dB decrease, the output shall

and no more than 800 ms from the instant of input level change. The input signal level shall be no greater than +10 to -20 DBM.

3.2.1.1.3.2 Receive voice path. - The loss in all received voice paths from the FAA demarcation point to the volume control shall be constant 0 dB within + 1 dB, exclusive of a linear gain/loss adjustment. This adjustment



gain/loss shall be provided with a range of + 15 dB. Surge protection shall be provided at the jack module to prevent any signal exceeding a peak value of 100 SPL from reaching the headset.

3.2.1.1.3.3 Sidetone. - The sidetone level shall be 16 dB below the nominal Transmit level of the position jack. When a position is transmitting, the sidetone leakage as measured across the speaker terminals shall be at least 50 dB below the received audio level set by the speaker volume control.

3.2.1.1.4 Information tones. - The information tones generated by the system shall be in accordance with Table 1.

3.2.1.1.5 Pushbutton signaling tones. - Pushbutton signaling tones shall be in accordance with Table 2.

3.2.1.1.6 Repetitive tone suppression. - Extraneous repetitive tones, or constant-frequency noise signals in the voice band, shall not be generated or propagated by the system. However, if tones are used during maintenance, provision shall be made to prevent their suppression.

The ICSS shall accomplish tone suppression by utilizing an active amplifier which has no effect on band pass except when a tone is present. If a tone is injected into the system at any point (before the tone suppression amplifier) and at any frequency, the tone suppression function shall detect and attenuate the tone by at least 10 dB within 10 ms. This tone suppression function shall be as near to the headset as possible. Passive tone notch filters are not acceptable.

3.2.1.2 ATC position equipment. - ATC position equipment provides the operator with the tools to initiate or respond to communications. Figure 2 is a drawing of a typical ICSS ATC position. The requirements for the various components and their functions are specified in the subsequent paragraphs.





placed in queues according to availability of the desired service. Each queue shall hold a readily adjustable number up to 30 incoming calls, as specified in the contract schedule. An interface to a music source shall be provided. Audio from this music source interface shall be routed by the system to callers placed in queue and on hold.

Up to 10 simultaneous connections to each of the 18 prerecorded PATWAS briefings are required. Up to 10 simultaneous connections to Fast File recorders are required.

The system shall be capable of placing Fastfile recordings in up to 4 logically separate storage areas. Each storage area shall be assignable to an ICSS position for debriefing responsibility. The ICSS operator at an ACD position shall be visually notified when Fastfiles, routed to his position, are available for debriefing. Aural notification of available Fastfiles, as well as a method to defeat this notification by nonlocking control, shall also be provided to ACD positions. In the event of an ACD system failure, the system shall provide a transfer switch that will connect up to 8 TELCO lines to designated locations in the ICSS positions.



3.2.1.2.2.12 Facility entrance intercom. - The facility entrance at designated locations, in accordance with the contract schedule, shall be provided with one or more direct access intercom buttons. The requirements for direct access (non-override) intercom communications (3.2.1.2.2.1.1) shall apply to the facility entrance position.

3.2.1.2.2.13 Position monitoring. - ATC positions, designated in accordance with the contract schedule, shall be provided the capability to monitor up to 5 other positions; the capability to monitor a single position by up to 5 positions shall also be provided. All audio, incoming and outgoing, and including tones from the position being monitored, shall be reproduced in the headset or loudspeaker (as selected by a headset/loudspeaker button) at the monitoring position. No indication shall be given to the monitored position when monitoring is initiated or in progress. Means to select the positions to be monitored either directly or indirectly shall be provided.

One monitor position at each facility shall be provided with a jack into which a GFE recorder may be connected. The jack outputs shall provide (1) all incoming and outgoing audio from the monitored position, including tones; and (2) voice actuated dry contacts suitable for controlling the recorder. No indication that recording is in progress shall be given to the monitored positions.

3.2.1.2.2.14 ACD Call termination. - Two modes of operation, manual and automatic, shall be provided for the termination of IC/IP calls. A Manual/Automatic switch shall be provided at each ACD position. In the Manual mode, all ACD calls received by an ICSS position shall result in an audible ring at the position. Capability to answer and release calls, while in the Manual mode, shall be provided through manual pushbutton operation. In the automatic mode, the system shall signal an ICSS position of the receipt of a call by providing chime tones to the operator's headset. After signalling the operator, the system shall connect an incoming call automatically. In the automatic mode, when the distant party releases a call, the system shall automatically free the connected ICSS position of the call connection.

3.2.1.3 Switching equipment. - Switching equipment shall be provided which shall implement the required features of the system, as delineated in this specification.

for both interphone connections to trunk circuits and radio signals to Government furnished transmitters and receivers. This equipment shall be in compliance with Part 68 of Federal Communications Commission (FCC) rules. A registration, certification number and ringer equivalence shall be obtained.

3.2.1.4.1 Interphone universal trunk interface equipment. - Universal trunk interface equipment shall be provided to permit the interphone circuits to interface with telephone systems and equipment external to the ICSS on both a two wire and four wire basis. The universal trunk interface shall include signaling equipment, jack circuits and protection equipment. The type of trunk interfacing to be used depends upon the supervision requirement of the external system, and shall be provided in accordance with the contract schedule.



instruction from a supervisory position. The type of configuration required for Type II and III systems shall be acceptable for use in Type I systems. The reconfiguration process shall not interrupt either any call in progress or the function of indicators and controls unaffected by the reconfiguration. Reconfigurable parameters shall include the following:

- a. Intercom, interphone, and trunk terminations for direct access buttons.
- b. Radio frequencies and associated main/standby equipment selection capability available at a position.
- c. The function of the special function pushbuttons described herein.
- d. The alphanumeric message in display modules, where used.

All ICSS systems which use automated reconfiguration shall be capable of generating a printed record of the current configuration. Software changes required for different configurations shall be limited to changes of parameters and tables.

3.2.1.5.1 Hardware or firmware reconfiguration (Type I systems). - A rapid and convenient way for changing the configuration of Type I systems is required. Acceptable methods may use firmware changes, switch actions, jack panels or program controlled reconfiguration (as required for Types II and III systems). Changes requiring replacements of major modules or requiring wire wrap or soldering are not acceptable. All equipment necessary to accomplish reconfigurations on-site shall be supplied by the contractor. The reconfiguration of any position shall require no more than one hour.

3.2.1.5.2 Program controlled reconfiguration (Type II and Type III systems). - The reconfiguration of Type II and Type III systems shall be automated and under the control of a designated operator. Type II and III systems shall also automatically adapt the system configuration in response to the addition or deletion of operator positions. A minimum of 10 maps, which are data sets used to define particular configurations, shall be retained in digital storage. After system reconfiguration has been initiated under the control of a designated operator, each affected position shall receive a visual and audible indication that the position is ready for reconfiguration. The reconfiguration enable pushbutton. An audible indication that the position reconfiguration is complete shall be provided at the position. A reverse video indication on the interactive display terminal shall be provided to show which positions have accepted reconfiguration. Five minutes after the initiation of a new map, if a position(s) has not accepted its new reconfiguration data, a flashing indication on the interactive display terminal shall be provided to show which position(s) has not accepted reconfiguration. One or both of the following levels of sophistication in configuration control hardware shall be provided for each ICSS. Reconfiguration of a single operator position (local reconfiguration) shall be accomplished within one second. Reconfiguration of the entire ICSS (global reconfiguration) shall be accomplished within thirty seconds.

3.2.1.5.2.1 Indirect access keypad control. Selection and implementation of new configuration maps from a designated supervisory ATC operator position shall be accomplished by entering code sequences into the indirect access keypad. Firmware or software storage of available maps and the control hardware necessary to implement the requested reconfigurations shall be provided. The means to produce new maps shall also be provided, although not necessarily by the operational system.

3.2.1.8 Maintenance and diagnostic equipment. - Internal hardware and software shall be included which can facilitate diagnosis of system status and assist maintenance efforts by alerting personnel to actual or impending failures. Fault isolation down to the lowest possible level shall be provided. An interactive terminal separate from the terminal used for reconfiguration control shall be provided for this purpose. A maintenance position shall be supplied when ordered by the Government to allow access to any radio frequencies and telephone lines within the facility. The maintenance position shall include an indirect access keypad, dual-jack module, speaker module, direct access buttons, four radio frequencies, and associated frequency display.

3.2.1.9 Power system equipment. - An uninterruptible power supply (UPS) shall be provided which shall detect AC Power line failures and supply to the system all required power to sustain operation under full load conditions for a minimum of 15 minutes. The transition to and from the UPS shall not degrade the operational and performance requirements of the system, nor shall transient effects occur. Whenever the contractor supplies equipment in accordance with this specification which is located beyond the area serviced by the system UPS, a separate UPS shall be provided at each such location.

3.2.1.10 Cabling. - The contractor shall provide all necessary intraconnecting and interconnecting cables and connectors for voice, control and power. Cabling to position module holders shall be terminated in plug-in connectors. Cabling to remote sites shall be furnished by the Government, unless such cabling is not currently available and provides connections to remotely located contractor-supplied equipment.

3.2.1.11 Support Telephone System. - A telephone system with interface capability to FAA switching systems, shall be provided to support the operational and administrative requirements of the facility.

This telephone system shall be able to service single-line, multi-line, push button and DTMF instruments. Additionally, it shall have the capability to serve up to twenty-eight (28) telephone trunks (DP/DTMF), and sixty-four (64) extensions within the facility and its remote sites. Features such as speed-dial, redial, auto recall, call forwarding, hold, call transfer, intercom calling, call queing, as well as external audio input and output ports shall be provided by the system.

## 3.2.2 Physical characteristics.

3.2.2.1 Modularity. - The ICSS shall be modular in construction so that operating positions, radio channels and interphone trunk circuits may be added or removed incrementally without system disruption. Expansion shall be accomplished by the addition of printed circuit cards, plug-in modules, rack subassemblies and racks. Circuit cards and modules shall be removable without requiring maintenance action outside of the rack subassembly. To meet this requirement, the ICSS design may require a power switch for each subassembly or module.

3.2.2.2 Cabinet and frame construction. - The equipment room racks, cabinets, and frames shall not exceed 84 inches in height, 36 inches in width and 30 inches in depth. The cabinets and frames shall not apply an average weight distribution or floor loading exceeding 125 lb/square foot. The structural strength and rigidity of the cabinets and frames shall be such that normal handling in loading, shipping, unloading and setting into position shall not result in any permanent set or deformation which would impair or interfere with the removal or addition of modules. Interchanging of equipment and modules shall not cause any permanent set or deformation to the cabinet





